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Application No. 10/776,533
Proposed Amendment
Reply to Office Action of October 13, 2006

Docket No.: 0630-1967P

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A ~~[header of a nano-storing-]~~ storage apparatus comprising:
 - a cantilevery array ~~including cantilevers each having a probe that is able to read and write information with the 'n' number of rows and the 'm' number of columns (n, m = 1, 2, 3, ...)~~ cantilever probes;
 - an X-redundancy cantilever array ~~to be used as a substitute~~ configured to read and write information when cantilever probes of a specific row in the cantilever array are defective;
 - a Y-redundancy cantilever array ~~to be used as a substitute~~ configured to read and write information when cantilever probes of a specific column in the cantilever array are defective; and
 - a header controller ~~for controlling each part~~ configured to select the X-redundancy cantilever array and the Y-redundancy cantilever array when the cantilever probes of the specific row and of the specific column in the cantilever array are defective.
2. (Currently Amended) The header apparatus of claim 1, wherein the header controller comprises:
 - ~~the an~~ an X-decoder for receiving configured to receive an X-address signal and driving to drive cantilevers of a the specific row in the cantilever array;
 - ~~the an~~ an X-redundancy decoder for stopping configured to stop driving of the X-decoder when cantilevers the cantilever probes of a the specific row in the cantilever array are defective and selecting to select the X-redundancy cantilever array;
 - ~~the a~~ a Y-decoder for receiving configured to receive an Y-address signal and selectively driving a drive the specific column in the cantilever array; and
 - ~~the a~~ a Y-redundancy decoder for stopping configured to stop driving of the Y-decoder when cantilevers the cantilever probes of a the specific column in the cantilever array are defective, and selecting to select the Y-redundancy cantilever array.
3. (Currently Amended) The header apparatus of claim 2, wherein the X-redundancy decoder stops driving of the X-decoder when the X-redundancy cantilever array is selected.

BEST AVAILABLE COPY

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4. (Currently Amended) The header apparatus of claim 2, wherein the X-redundancy decoder comprises:

an output terminal ~~for outputting~~ configured to output a stop signal to the X-decoder when ~~cantilevers the cantilever probes of a~~ the specific row in the cantilever array are defective;

~~a unit for transferring a high voltage unit configured to transfer~~ a high voltage (V_{CC}) to the output terminal by a specific pulse signal (XRP);

~~a unit for receiving a low voltage unit configured to receive~~ the X-address signal and ~~outputting to output~~ a low voltage (0V) to the output terminal; and

a plurality of fuses connected between the output terminal and the low voltage unit which outputs the low voltage, and to selectively defused- defuse when ~~cantilevers the cantilever probes~~ of a the specific row in the cantilever array are defective.

5. (Currently Amended) The header apparatus of claim 4, wherein the X-redundancy decoder converts signal values received from the high voltage ~~outputting-unit~~ and the low voltage ~~outputting-unit~~ into logical values and outputs the corresponding signal values to the X-decoder and the X-redundancy cantilever array.

6. (Currently Amended) The header apparatus of claim 4, wherein ~~as the fuse, comprises~~ a polysilicon line or a metal line ~~is used, and the fuse that~~ can be ~~melt-melted~~ by using an overcurrent, cut by a laser beam or programmed by an EPROM memory cell.

7. (Currently Amended) The header apparatus of claim 2, wherein the header controller further comprises:

a Y-switch ~~for receiving~~ configured to receive an output signal of the Y-decoder when ~~cantilevers the cantilever probes of a the~~ specific column in the cantilever array are defective, and ~~cutting to cut off~~ a data output of the defective ~~cantilevers cantilever probes~~ of the specific column; and

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a Y-redundancy switch ~~for receiving~~ configured to receive an output signal of the Y-redundancy decoder when ~~cantilevers~~ the cantilever probes of a the specific column in the cantilever array are defective, and ~~switching to switch~~ a data output of the Y-redundancy cantilever array.

8. (Currently Amended) The header apparatus of claim 7, wherein when the Y-redundancy cantilever array is selected, the Y-redundancy decoder stops driving ~~of the~~ Y-decoder and outputs a signal for selecting the Y-redundancy switch.

9. (Currently Amended) The header apparatus of claim 2, wherein the Y-redundancy decoder comprises:

an output terminal ~~for outputting~~ configured to output a stop signal to the Y-decoder when ~~cantilevers~~ the cantilever probes in a the specific column in the cantilever array are defective;

~~a unit for outputting a high voltage unit configured to output~~ a high voltage (V_{cc}) to the output terminal by a specific pulse signal (YRP);

~~a unit for receiving a low voltage unit configured to receive~~ a Y-address signal and outputting a low voltage (0V); and

a plurality of fuses connected between the output terminal and the low voltage ~~outputting~~ unit, and ~~to selectively defused~~ defuse when ~~cantilevers~~ the cantilever probes of a the specific column in the cantilever array are defective.

10. (Currently Amended) The header apparatus of claim 1, wherein the X-redundancy cantilever array includes ~~the 'p' number of rows and the 'm' number of columns~~ ($p \leq n$, $p=1, 2, 3..$), and if the cantilever probes of a the specific row in the cantilever array having ~~the an~~ an $n \times m$ number of cantilevers are defective, cantilevers of a the specific row of the X-redundancy cantilever array are substitutively used, and meanwhile, the Y-redundancy cantilever array includes the 'n' number of rows and 'k' number of columns ($k \leq m$, $k=1, 2, 3, \dots$), and if the cantilever probes of a the specific column in the cantilever array having the $n \times m$ number of

BEST AVAILABLE COPY

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cantilevers are defective, cantilevers of a the specific column in the Y-redundancy cantilever array are substitutively used.

11. (Canceled)

12. (Currently Amended) The header apparatus of claim ~~11~~ 2, wherein the X-decoder includes NAND gates and inverters connected to the NAND gates, ~~and drives the cantilever array upon receiving the X-address signal or stops the cantilever array upon receiving a signal from the X-redundancy decoder.~~

13-15. (Canceled)

16. (Currently Amended) The header apparatus of claim ~~15~~ 7, wherein the Y-decoder comprises:

NAND gates ~~for receiving~~ configured to receive the Y-address signal and a signal from the Y-redundancy decoder and ~~turning to turn on or off a switch of the Y-switch in order to enable a data output to or stop data output from cantilevers of a specific column in the cantilever array; and~~

~~Inverters~~ inverters connected to the NAND gates.

18. (Canceled)